

Sharing radiological images for data sharing and teleradiology involves several methods, each suited to different needs (speed, security, integration, scale). Here are the primary methods, categorized for clarity:

1. DICOM-Based Standardised Transfer

PACS (Picture Archiving and Communication System) is the main hospital system for storing and retrieving DICOM pictures. DICOM protocols are used to share data between connected PACS systems (Fennell, Ralston, & Coleman, 2021)..

Teleradiology platforms are dedicated cloud or on-premise software that allows radiologists to securely access, view, interpret, and report on studies from remote locations. Frequently combines with numerous source PACS (Peck, 2017).

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DICOM Web Services (WADO, WADO-RS, STOW-RS): Modern RESTful APIs that enable web-based retrieval (WADO/WADO-RS) and storage (STOW-RS) of DICOM objects via HTTPS. Required for web viewers and EHR integration.

Vendor Neutral Archives (VNA) are central repositories that store DICOM (and often non-DICOM) data from various PACS/sources. By operating as a single source, it makes it easier to share information across departments and institutions (Fennell, Ralston, & Coleman, 2021).

2. Cloud-based platforms.

Enterprise Imaging Clouds: Comprehensive solutions that replace or supplement traditional PACS/VNA, providing worldwide access to storage, sharing, viewing, and AI technologies via the web.

Cloud PACS/VNA: Cloud-hosted versions of classic systems that allow for simpler cross-facility sharing without requiring complex on-site equipment.

Image Exchange Networks: Regional/national networks (e.g., Image Exchange Portal in the United Kingdom, several HIEs in the United States) that enable approved providers to access patient images from multiple institutions.

Vendor-Specific Clouds: PACS vendors provide their own cloud systems for sharing among their customers.

4. Healthcare Information Exchange (HIE) and Direct Messaging

IHE Cross-Enterprise Document Sharing (XDS/XDS-I.b): Standards-based profiles for exchanging documents (such as diagnostic reports and image manifests/references) between healthcare organizations inside an HIE (Rajaei, 2023).

Secure Messaging: A HIPAA-compliant email-like protocol for transmitting encrypted health information (including image reports and, in some cases, embedded key images or links to images) directly between trusted institutions (Rajaei, 2023).

5. Patient-Mediated Sharing.

Patient portals are integrated with EHR/PACS, allowing patients to see and download their own images/reports (typically in DICOM viewers or PDF/JPEG format).

Patient-Accessible Image Binders: Solutions (such as Life Image and Pocket Health) that allow patients to collect and share their imaging records with doctors via secure links or access codes, typically utilizing DICOM web or proprietary APIs (Peck, 2017).

6. Physical Media

CD/DVD/USB: Burned discs or encrypted USB drives that contain DICOM viewers and images. Significant downsides include security threats (loss/theft), incompatibility (outdated viewers, Mac/PC difficulties), manual labor, and poor turnaround (Peck, 2017).

- 1) Peck, A. (2017). *Clark's Essential PACS, RIS and Imaging Informatics*. CRC Press.
- 2) Rajaei, L. (2023). *Health information exchanges (HIEs) and interoperability*. [online] [www.elationhealth.com](https://www.elationhealth.com/resources/blogs/health-information-exchanges-hies-and-interoperability). Available at: <https://www.elationhealth.com/resources/blogs/health-information-exchanges-hies-and-interoperability>.
- 3) Fennell, N., Ralston, M. D., & Coleman, R. M. (2021). PACS and other image management systems. In *Practical Imaging Informatics: Foundations and Applications for Medical Imaging* (pp. 131-142). New York, NY: Springer US.